GLOBAL CMA

OPERATION MANAGEMENT & STRATEGIC MANAGEMENT

Paper-9

Syllabus-2016

Answer of Postal test Paper

Set-1

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Sol. 1 MCQ

1. C
2. B
3. C
4. B
5. B

Sol. 2 True / False

1. TRUE
2. FALSE
3. FALSE
4. TRUE
5. TRUE

Sol.3 Match :

1.	Inventory Control	Stock Level
2.	Network Analysis	Crashing
3.	Aviation Fuel	Refinery
4.	Hydro-Electricity	Turbo Alternator
5.	Improvement in Productivity	Value Analysis

Sol. 4 Fill Ups:

1. Short Range Planning
2. Net Evaluation Table
3. Higher
4. Gantt Chart

Sol. 5(a) Answer

We can call the years as 'X' and exports as 'Y. In order to use the normal equations for the least square line, we need ΣX, ΣY, ΣXY and ΣX2. If we arrange X in such a way that ΣX = 0, it will simplify our calculations. Therefore, we call the year 2008 as 0, 2007 as -1 and 2009 as + 1 and likewise for the other years in the data.

The rearrangement is shown in the table as follows:

X	Y	X^2	XY
-4	13	16	-52
-3	20	9	-60
-2	20	4	-40
-1	28	1	-28
0	30	0	0
1	32	1	32
2	33	4	66
3	38	9	114
4	43	16	172
ΣX = 0	ΣY = 257	$\Sigma x^2 = 60$	ΣXY - 204

$\Sigma Y = a_o N + a_1 \Sigma X$

$\Sigma XY = a_o \Sigma X + a_1 \Sigma X^2$

As $\Sigma X = 0$ and $\Sigma Y = a_o N$ and $\Sigma XY = a_1 \Sigma X^2$

Therefore, $a_o = \Sigma Y / N = 257 / 9 = 28.56$

$a_1 = \Sigma XY / \Sigma X^2 = 204 / 60 = 3.4$

The equation of a straight line fitting the data is:

$Y = 28.56 + 3.4\ X$

(a) Forecast for 2013, (i.e., X = 5): $Y = 28.56 + 3.4\ (5) = 45.56$

(b) Forecast for 2014, (i.e., X = 6): $Y = 28.56 + 3.4\ (6) = 48.96$

Sol.5 (b) Answer

(i) Break-even point

Let QBEP be the break even point.

FC = Fixed cost, R = Revenue per unit, VC = Variable cost

Then QBEPR = FC + (VC) QBEP

$$QBEP = \frac{FC}{(R - VC)}$$

Let Q1 be the break-even-point for one machine option

Then, $Q1 = \frac{12000}{(50-20)} = \frac{12000}{30} = 400$ units

(Not within the range of 0 to 300)

Let Q2 be the break-even-point for two machines option.

Then, $Q2 = \frac{15000}{(50-20)} = \frac{15000}{30} = 500$ units

(within the range of 301 to 600)

Let Q3 be the break-even-point for three machines option.

Then, $Q3 = \frac{21000}{(50-20} = \frac{21000}{30} = 700$ units

(with in the range of 601 to 900)

(ii) The projected demand is between 600 to 650 units.

The break even point for single machine option (i.e., 400 units) is not feasible because it exceeds the range of volume that can be produced with one machine (i.e., 0 to 300).

Also, the break even point for 3 machines is 700 units which is more than the upper limit of projected demand of 600 to 650 units and hence not feasible. For 2 machines option the break even volume is 500 units and volume range is 301 to 600.

Hence, the demand of 600 can be met with 2 machines and profit is earned because the production volume of 600 is more than the break even volume of 500. If the manager wants to produce 650 units with 3 machines, there will be loss because the break even volume with three machines is 700 units. Hence, the manager would choose two machines and produce 600 units.

Sol. 6(a) Answer

Random No. Range Table			
Demand	**Probability**	**Cumulative Probability**	**Random Range**
15	.05	.05	0-4
16	.08	.13	5-12
17	.20	.33	13-32
18	.45	.78	33-77
19	.10	.88	78-87
20	.07	.95	88-94
21	.03	.98	95-97
22	.02	1.00	98-99
	1.00		

Calculation of demand and profit for next 20 years					
Year	**Random Numbers**	**Expected demand**	**No. of books unsold if stock is**		
			16	**17**	**18**
1	14	17	-	-	1
2	02	15	1	2	3
3	93	20	-	-	-
4	99	22	-	-	-
5	18	17	-	-	1
6	71	18	-	-	-
7	37	18	-	-	-
8	30	17	-	-	1
9	12	16	-	1	2
10	10	16	-	1	2
11	88	20	-	-	-
12	13	17	-	-	1
13	00	15	1	2	3
14	57	18	-	-	-
15	69	18	-	-	-
16	32	17	-	-	1
17	18	17	-	-	1
18	08	16	-	1	2
19	92	20	-	-	-
20	73	18	-	-	-
Total			**2**	**7**	**18**

Statement Showing Computation of Profit			
No. of Books order	**No. of Books sold**	**Profit**	**Average Profit**
15	15 x 20 = 300	₹ 6000	₹ 300
16	16 x 20 – 2 = 318	₹ 6300 (318 x 20) – 2 x 30	₹ 315
17	(17 x 20) – 7 = 333	₹ 6450 (333 x 20) -7 x 30	₹ 322.5
18	(18 x 20) – 18	₹ 6300 (342 x 20) – 18 x 30	₹ 315

Since profit is more at 17 books order, it is the best quantity and ordering is more optimum.

Sol. 6(b)

Answer:

Cost of machine, C = ₹ 15,000 + ₹ 3,500 = ₹ 18,500

Scrap value, S = ₹ 1,500.

Year	Maintenance Cost, M_1 (₹)	Cumulative Maintenance Cost, ΣM_1 (₹)	C – S (₹)	Total Cost $T_{(n)}$ (₹)	Annual Cost $A_{(n)}$ (₹)
(i)	(ii)	(iii)	(iv)	(v)= (iii)+(iv)	(vi)=(v)/n
1	260	260	17,000	17,260	17,260
2	760	1,020	17,000	18,020	9,010
3	1,100	2,120	17,000	19,120	6,373
4	1,600	3,720	17,000	20,720	5,180
5	2,200	5,920	17,000	22,920	4,584
6	3,000	8,920	17,000	25,920	4,320
7	4,100	13,020	17,000	30,020	4,288*
8	4,900	17,920	17,000	34,920	4,365
9	6,100	24,020	17,000	41,020	4,557

Lowest average cost is ₹4,288 approx., which corresponds to n = 7 in above table. Thus machine needs to be replaced every 7th year.

Sol. 7(a)

Answer:

(a) The processing time needed in hours to produce products A, B and C in the quantities demanded using the standard time data:

Product	Annual Demand (units)	Processing time (standard time in hours)	Processing time needed (hrs.)
A	325	5.0	325 × 5 = 1,625
B	450	4.0	450 × 4 = 1,800
C	550	6.0	550 × 6 = 3,300
			Total = 6,725 hrs.

(b) Annual production capacity of one machine in standard hours = 8 × 288 = 2,304 hours per year.

(c) Number of machines required = Work load per year / Production capacity per Machine = 6,725 / 2,304 = 2.90 machines = 3 machines.

Sol. 7(b)

Solution:

Step 1: Calculate the processing time needed in hours to produce product x, y and z in the quantities demanded using the standard time data.

Product	Annual demand (units)	Standard processing per unit (Hrs.)	Processing needed (Hrs.)
X	300	4.0	300 x 4 = 1200 Hrs.
Y	400	6.0	400 x 6 = 2400 Hrs.
Z	500	3.0	500 x 3 = 1500 Hrs.
			Total = 5100 Hrs

Step 2 : Annual production capacity of one machine in standard hours = 8 × 250 = 2000 hours per year

Step 3 : Number of machines required

$$= \frac{\text{Work load per year}}{\text{Production capacity per machine}} = \frac{5100}{2000} = 2.55 \text{ machines} = 3 \text{ machines.}$$

Sol. 8(a)

Solution:

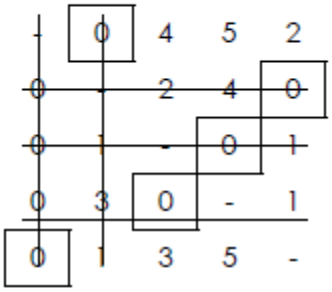
Profit Matrix

-	12	24	25	15
6	-	16	18	7
10	11	-	18	12
14	17	22	-	16
12	13	23	25	-

Row Operation

-	0	12	13	3
0	1	10	12	1
0	1	-	8	2
0	3	8	-	2
0	1	11	13	-

Column Operation



A → B → E → D → C → A

12 + 7 + 25 + 22 + 10 = 76 Kms

Optimum Distance 76 Kms.

Sol. 8(b)

Solution:

15	35	0	25	10	45
40	5	45	20	15	20
25	60	10	65	25	10
25	20	35	10	25	60
30	70	40	5	40	50
10	25	30	40	50	15

Row Operation

15	35	0	25	10	45
35	0	40	15	10	15
15	50	0	55	15	0
15	10	25	0	15	50
25	65	35	0	35	45
0	15	20	30	40	5

Column Operation

15	35	0	25	10	45
35	0	40	15	0	15
15	50	0	55	5	0
15	10	25	0	5	50
25	65	35	0	25	45
0	15	20	30	30	5

Improved Matrix

20	35	0	30	0	45
40	0	40	20	0	15
20	50	0	60	5	0
15	5	20	0	0	45
25	60	30	0	20	40
0	10	15	30	30	0

A	→ III	-	0
B	→ II	-	5
C	→ VI	-	10
D	→ V	-	25
E	→ IV	-	5
F	→ I	-	10
			₹ 55 Minimum Cost

(b)

Loss Matrix

55	35	70	45	60	25
30	65	25	50	55	50
45	10	60	5	45	60
45	50	35	60	45	10
40	0	30	65	30	20
60	45	40	30	20	55

Row Operation

30	10	45	20	35	0
5	40	0	25	30	25
40	5	55	0	40	55
35	40	25	50	35	0
40	0	30	65	30	20
40	25	20	10	0	35

Column Operation

25	10	45	20	35	[0]
[0]	40	0	25	30	25
35	5	55	[0]	40	55
30	40	25	50	35	0
35	[0]	30	65	30	20
35	25	20	10	[0]	35

Improved Matrix

5	10	25	20	35	[0]
[0]	60	0	15	50	45
15	5	35	[0]	40	55
10	40	5	50	35	0
15	[0]	10	65	30	20
15	25	[0]	10	0	35

[0]	10	20	20	30	0
0	65	[0]	50	50	50
10	5	30	[0]	35	55
5	40	0	50	30	[0]
10	[0]	5	65	25	20
15	30	0	15	[0]	40

A	→	I	-	15
B	→	III	-	45
C	→	IV	-	65
D	→	VI	-	60
E	→	II	-	70
F	→	I	-	50
				₹ 305

Maximum

(c) The cost matrix after imposing the given restriction is

Region

		I	II	III	IV	V	VI
	A	15	35	0	25	a	45
	B	40	5	45	20	15	10
Sales man	C	25	60	10	65	25	10
	D	25	20	35	10	25	60
	E	30	a	40	5	40	50
	F	10	25	30	40	50	15

Sol. 10 MCQ

- D
- A & B
- C
- D
- D
- C

Sol. 11(a)

Major Steps in Strategic Management Process

Steps of Strategic Management Process:

Step 1: Identifying Defining Business Mission, Purpose and Objectives: Identifying or defining an organisation's existing mission, purpose and objectives is the logical starting point as they lay foundation for strategic management. Every organisation has a mission, purpose and objectives, even if these elements are not consciously designed, written & communicated. These elements relate the organisation with the society and states that it has to achieve for itself and to the society.

Step 2: Environmental Analysis: Environmental factors — both internal environment and external environment — are analysed to:

(i) identify changes in the environment,

(ii) identify present and future threats and opportunities, and

(iii) assess critically it's own strengths and weaknesses.

Organisational environment encompasses all factors both inside and outside the organisation that can influence the organisation positively and negatively. Environmental factors may help in building a sustainable competitive advantage.

Step 3: Revise Organisational Direction: A thorough analysis of organisation's environment pinpoints it's strengths, weaknesses, opportunities and threats (SWOT). This can often help management to reaffirm or revise it's organisational direction.

Step 4: Strategic Alternatives and Choice: Many alternative strategies are formulated based on possible options and in the light of organisational analysis and environmental appraisal. Alternative strategies will be ranked based on the SWOT analysis. The best strategy out of the alternatives will be chosen.

The steps from identification of business mission, purpose and objectives of alternative strategies and choice can be grouped into the broad step of strategy formulation.

Step 5: Strategy Implementation: The fifth step of strategic management process is the implementation of strategy. The logically developed strategy is to be put into action. The organisation can not reap the benefits of strategic management, unless the strategy is effectively implemented.

The managers should have clear vision and idea about the competitor's strategy, organisation's culture, handling change, skills of the managers-in-charge of implementation and the like. The progress from the stage of identification of business mission, purpose and objectives to the stage of achieving desired performance must overcome many obstacles.

Step 6: Strategic Evaluation and Control: The final step of strategic management process is strategic evaluation and control. It focuses on monitoring and evaluating the strategic management process in order to improve it and ensure that it functions properly. The managers must understand the process of strategic control and the role of strategic audit to perform the task of control successfully.

Sol. 11(b)

Steps in Contingency Planning

Robert Linnemam and Rajan Chandran have suggested that a seven step process as follows:

Step 1 - Identify the beneficial and unfavourable events that could possibly derail the strategy or strategies.

Step 2 - Specify trigger points. Calculate about when contingent events are likely to occur.

Step 3 - Assess the impact of each contingent event. Estimate the potential benefit or harm of each contingent event.

Step 4 - Develop contingency plans. Be sure that contingency plans are compatible with current strategy and are economically feasible.

Step 5 - Assess the counter impact of each contingency plan. That is, estimate how much each contingency plan will capitalize on or cancel out its associated contingent event. Doing this will quantify the potential value of each contingency plan.

Step 6 - Determine early warning signals for key contingency event. Monitor the early warning signals.

Step 7 - For contingent event with reliable early warning signals, develop advance action plans to take advantage of the available lead time.